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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,392	12/02/2003	Hiromichi Kumakura	31904-3	5617

7590 07/26/2004

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EXAMINER
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WARREN, MATTHEW E

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/726,392

Applicant(s)

KUMAKURA ET AL.

Examiner

Matthew E Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 14-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-7, 14-16 and 18-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/2/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

This Office Action is in response to the Election filed on April 24, 2004.

### ***Election/Restrictions***

Applicant's election of Group II, claims 1-7 and 14-21 in the reply filed on April 24, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Prior Art Figure 2 (APAF 2) in view of Aoi (US 6,197,696 B1).

The APAF 2 shows a semiconductor device comprising: a semiconductor base (103), a first insulation film (109) which is provided on said semiconductor base and is

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made of a silicon material, a second insulation film (108) which is provided on said first insulation film, is made of an organic material and is thicker than said first insulation film. A wiring layer (107) is provided on said second insulation film, wherein a current flows between said wiring layer and an external terminal (106). The APAF shows all of the elements of the claims except the third insulation film on the second insulation film. Aoi shows (fig. 3c) a semiconductor device comprising: a semiconductor base (100), a first insulation film (102A) which is provided on said semiconductor base and is made of a silicon material, a second insulation film (103A) which is provided on said first insulation film, is made of an organic material and is thicker than said first insulation film. A third insulation film (104A), which is provided on said second insulation film, is made of a silicon material and is thinner than said second insulation film (col. 10, lines 29-54). The third insulation film is used to improve the adhesion of the organic film and the wiring layer (col. 12, lines 12-22). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the insulating structure of the APAF 2 by adding a third insulating layer as taught by Aoi to improve the adhesion of the underlying organic film and subsequent wiring layer.

In re claim 2, Aoi shows (fig. 3c) a fourth insulation film (105A) is provided between said third insulation film and said wiring layer so as to cover an entire surface of said third insulation film and is made of an organic material (col. 10, lines 40-45).

In re claim 3, Aoi discloses (col. 12, lines 8-11) that a fifth insulation film is provided between said fourth insulation film and said wiring layer and is made of a silicon material because the metal levels and interlayer dielectrics can be repeated.

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In re claim 6, the APAF 2 discloses that said wiring layer is made of metal.

In re claim 7, the APAF 2 shows that said wiring layer constitutes a metal pad (107) which is connected to said external terminal (106), and/or a metal wire through which the current flows via said metal pad.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Prior Art Figure 2 (APAF 2) in view of Aoi (US 6,197,696 B1) as applied to claims 1 and 2 above, and further in view of Noda (JP 2001-177115 A).

In re claim 5, neither reference discloses that said fourth insulation film is made of polybenzoxazole resin. Noda discloses (abstract) that an organic material may be formed of polybenzoxazole resin to form a reliable semiconductor device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the organic material of the APAF 2 and Aoi by using polybenzoxazole resin as taught by Noda to provide a highly reliable semiconductor device.

Claims 14-16, 18, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Prior Art Figure 2 (APAF) in view of Lin (US 6,657,310 B2).

The APAF 2 shows a semiconductor device comprising: a semiconductor base (103), a first insulation film (109) which is provided on said semiconductor base and is made of a silicon material, a second insulation film (108) which is provided on said first insulation film, is made of an organic material and is thicker than said first insulation

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film. A wiring layer (107) is provided on said second insulation film, wherein a current flows between said wiring layer and an external terminal (106). The APAF shows all of the elements of the claims except the third insulation film on the second insulation film wherein the third insulation film has a moisture resistant property. Lin shows (fig. 2) a semiconductor device having first and second (2 and 3) lower insulation films. A third insulation film (4) of silicon nitride, having a moisture resistance property, is formed on those films to provide protection from moisture and contamination. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the insulation structure of the APAF 2 by adding a third insulation layer having a moisture resistance property as taught by Lin to provide protection from moisture and contamination.

In re claim 15, Lin shows (fig. 2) that a fourth insulation film (film within layer 3 and beneath film 4) is provided between said third insulation film and said wiring layer so as to cover an entire surface of said third insulation film in order to prevent said third insulation film from being damaged.

In re claim 16, Lin shows (fig. 2) the device further comprising a fifth insulation film (5) which is provided between said fourth insulation film (3) and a wiring layer (10) but does not specifically disclose that it functions as an adhesive layer for preventing separation of said wiring layer. However, because the materials and structure is the same as the instant invention, the fifth insulation layer of Lin inherently functions as an adhesive layer.

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In re claim 18, Lin (fig. 2) does not specifically disclose that said fourth insulation film functions as an adhesive layer for preventing separation of said wiring layer.

However, because the materials and structure is the same as the instant invention, the fourth insulation layer of Lin inherently functions as an adhesive layer.

In re claim 20, the APAF 2 discloses that said wiring layer is made of metal.

In re claim 21, the APAF 2 shows that said wiring layer constitutes a metal pad (107) which is connected to said external terminal (106), and/or a metal wire through which the current flows via said metal pad.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Prior Art Figure 2 (APAF) in view of Lin (US 6,657,310 B2) as applied to claims, 14, 15, and 18 above, and further in view of Noda (JP 2001-177115 A).

In re claim 5, neither reference discloses that said fourth insulation film is made of polybenzoxazole resin. Noda discloses (abstract) that an organic material may be formed of polybenzoxazole resin to form a reliable semiconductor device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the organic material of the APAF 2 and Lin by using polybenzoxazole resin as taught by Noda to provide a highly reliable semiconductor device.

***Allowable Subject Matter***

Claims 4 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

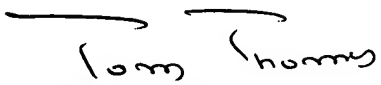
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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MEW

*MEW*

July 22, 2004

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800